Citrus Industry

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AN IMPORTANT CHANGE

An important change has just taken place in the management of Florida Citrus Mutual, Florida's super-cooperative agency serving the state's great citrus industry. General Manager A. V. Sauerman, who has served Mutual for the past two years is leaving to resume active management of his own large grove interests at Clearwater. He is succeeded as general manager by Robert W. Rutledge, well known an active worker in citrus circles. Mr. Rutledge comes to Mutual with a background of successful management in numerous important enterprises. Mr. Sauerman served as general manager of Mutual during the two most trying years of its existence. He leaves the active management with the best wishes of the directorate and membership of Mutual. In its new manager Mutual looks forward to continuation of a program of activity on behalf of citrus growers.

GROWERS AND SHIPPERS LEAGUE OBSERVES TWENTY-NINTH BIRTHDAY

The twenty-ninth annual meeting of the Growers and Shippers League of Florida, recently held at Orlando, brought forth from the Secretary-Manager, Gordon Stedman, an encouraging report of the accomplishments of that active organization. While other organizations have been engaged in the marketing end of the industry, the League has concerned itself with transportation and securing of better rates and better methods of handling fruits and vegetables by the carriers. The League is ever on the alert in fighting the battles of the industry against proposed increases in rates by rail, water or truck, and against discriminatory trucking laws by other states. The industry owes much to the Growers and Shippers League of Florida for its services over the years.

This Month

Vol. 33, No. 9 Bartow, Florida September, 1952

Control of Purple Scale On Citrus . . . With Parathion

HERBERT SPENCER, MAX R. OSBURN, PAUL A. NORMAN

(Concluded From Last Issue)

Comparative Costs

The comparative costs of oil emulsion and parathion sprays have to be considered by users. At current prices (May 1951) stock oil emulsion containing 90 percent of oil, sells for about 31 cents per gallon and 15-percent parathion wettable powder for about 55 cents. The cost of applying 100 gallons of spray varies considerably but may be set at an average of $1.35.

Parathion can be added to a regularly scheduled wettable-sulfur spray for rust mites, which have to be controlled with a saparate spray if oil has been used for scale control. The use of parathion in combination with wettable sulfur will avoid the cost of a separate spray. Two pounds of 15-percent parathion per 100 gallons, added to the wettable-sulfur spray, will cost only $1.10 additional; 1 pound, only 55cents. With this treatment control of purple scale will be cheaper than with a separate oil application, which would have to be followed in 3 or 4 weeks with a wettable-sulfur spray.

A separate spray of oil emulsion containing 1.25 percent of oil costs $1.78 and a separate spray containing 2 pounds of 15-percent parathion costs $2.45 per 100 gallons. If the concentration of parathion is only 1 pound, the cost is $1.90 per 100 gallons, still slightly more than that of the oil spray.

Parathion in the Spray Program

Parathion has given as good control of purple scales as oil emulsion. Because it can be added to regularly scheduled wettable-sulfur sprays or to sprays of neutral copper and wettable sulfur at any time of the year when purple scale infestations develop, the necessity of a separate oil-emulsion spray is avoided and the number of yearly sprayings is reduced by one. It will not displace oil completely in the spray program except for clean-up of infestations between July and February. In the post-bloom spray, copper to which oil has been added is cheaper to use where diseases, scale insects, and citrus red mites are prevalent and where there is no infestation of rust mites. When rust mites are present, a combination spray of neutral copper, wettable sulfur, parathion, and a miticide such as Neotran will control melanose, rust mites, purple scales, and citrus red mites. It is expensive, but is preferable to a copper-oil spray followed in 3 to 4 weeks with a spray of wettable sulfur.

Summary

Parathion sprays give as good or better control of the purple scale (Lepidosaphes beckii (Newm.) than oil-emulsion sprays in 14 out of 15 comparisons in experiments on orange and grapefruit trees in

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4. These tests were made by Paul L. Harding and his testing panel at the Orlando, Fla., laboratory of the Bureau of Plant Industry, Soils, and Agricultural Engineering.

Citrus Insect Control For September, 1952 . . .

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A new hatch of red scale started in the first week of August, resulting in an increase in activity during the past two weeks. At the time this is written it is too early to know if a heavy fall increase will occur, as it did last year, but our activity index has not yet reached a high level. The percent of scales in the younger stages will probably remain high enough for good control at least through mid-September.

Purple scale usually does not have as clearly defined a fall hatch as does red scale, but there are indications that an increase in the rate of hatching is occurring. The peak of the hatch may be somewhat later than for red scale so the best period for control may extend through September.

Although the peak of purple mite activity was several weeks later than last year, when the usual seasonal mortality started to occur the decline has been very rapid, so the average infestation is now very low and only a few groves have heavy infestations. The population will probably remain at a low level through September, but dry weather could bring about an earlier increase.

Rust mite activity was at a fairly high level through July and there was a sharp increase in mid-August. Groves must be watched closely and control measures must be applied promptly if losses from russeting and greasy spot are to be avoided.

SPRAY PROGRAMS

Rust mite control will be necessary in many groves during the month of September. Even though there may have been the normal amount of rain, the mites are likely to increase where the infestations have been kept to a low level with sulfur sprays or dusts. During the rainy season sulfur sprays are more effective than sulfur dust. Wettable sulfur at 8 to 10 pounds per 100 gallons is the safest spray to use. A combination of 2/3 of a gallon of lime-sulfur plus 6 to 8 pounds of wettable sulfur may be used on late varieties of oranges and grapefruit but should not be used on early varieties of oranges, on tangerines or temples. The fruit, especially grapefruit, have increased in weight at this time to the extent that the branches are bent and the fruit more exposed to the sun than earlier in the summer. This exposed fruit is more susceptible to sunburn and spray burn than fruit protected with foliage. Sulfur, especially lime-sulfur, is likely to cause some injury to fruit that is already sunburned. For these reasons the safest possible spray should be used.

Since the average purple mite infestations are low at this time it is suggested that control measures be delayed until October or until some mites are found. However during late September a few groves may become heavily infested. In such cases a combination spray of either Ovotran or Neotran can be used with wettable sulfur.

Scale Control: Even though the average purple scale populations are low there are usually some exceptions. Scale crawlers will be settling on the young branches, fruit stems and under the bottom of the fruit more and more as fall and winter approaches, so that any groves where purple scale is increasing should be sprayed to prevent injury and fruit drop during the dry months of fall and winter.

Red scale infestations should be closely checked because the average infestation for the State is increasing. At this time of the year the life cycle is only about six weeks and a light infestation in September can develop into a heavy one by mid or late October. During the first part of September there should be a fairly high percentage of red scale in the younger stages, but during the latter part of the month there are indications that there will be many in the adult and egg stages which are more difficult to kill than when they are in the younger stages.

Particular attention should be paid to the amount of either red or purple scale in groves that have not been treated since the post-bloom period or even as late as the first week in June. Even though a high percentage of the scale may have been killed with the spring scalicide, it is usually necessary to make a second application in the summer or fall where red scale is a problem. It is also advisable to treat for purple scale where no scalicide has been applied

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*Written August 23, 1952. Reports of surveys by Harold Holtsburg, Cocoa; J. W. Davis, Tavares; K. G. Townsend, Tampa; J. B. Weeks, Avon Park; and T. B. Hallam, Lake Alfred.

Does Grove Irrigation Pay? Yes And No . . .

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AT CITRUS GROWERS INSTITUTE, CAMP McQUARRIE, AUG. 19

The question of irrigation is a very important one for the Florida citrus grower. The answer to this question is a difficult one and I do not have the complete answer. However, I would like to make some comments and raise a few questions. Generalizations will supply partial answers only. Irrigation is another of the many grove operations that needs to be timed and applied according to the needs of the individual grove. The answers to irrigation questions must be verly largely determined by the individual grove manager for the individual grove.

We have been going places in a hurry with citrus irrigation within the past few years. Some growers have invested from $400 to $600 per acre in irrigation equipment. An investment of $500 per acre is quite an investment and means quite an annual cost in interest and depreciation. The cost for adding water would be proportional to the number of applications and the amount of water added. At the present time total irrigation costs are usually around 5 cents per box per application with a 300-box yield.

Irrigation is not a new thing. It was practiced in Egypt and Persia over 4,000 years ago. According to the Bible, irrigation originated about the same time and at about the same place as man. In Genesis 2:10 we have the statement: "And a river went out of Eden to water the garden." With all the intervening time we have had, we still have not found all the answers to irrigation. California citrus is more dependent on irrigation for moisture than is Florida, and California has a few questions unanswered also.

One of our major problems is when, if ever, to irrigate. When the soil moisture is considered to be insufficient for the tree, water is sometimes added. This addition of water is usually called irrigation. One definition is: "Irrigation is the application of water to the land in lieu of rainfall." This definition is broad and is not related to the exact needs of citrus or frequency of application. The results are that a grove is termed an irrigated grove if it is irrigated occasionally. Some groves are irrigated more or less as the need arises. Others are irrigated only in extreme droughths. Some are not irrigated before the trees go into a permanent wilt. Comparable groves would not show the same results under extreme irrigation practices.

COST AND EFFICIENCY IN THE USE OF NITROGEN APPLIED, 1937-50
Trees 30 years of age and 31 percent Grapefruit

Pounds of N per box	Irrigated Percent distribution of groves	Irrigated Boxes Per Acre	Irrigated Operating cost Per Acre	Irrigated Operating cost Per Box	Nonirrigated Percent Distribution of groves	Nonirrigated Boxes Per Acre	Nonirrigated Operating cost Per Acre	Nonirrigated Operating cost Per Box	Relative advantage percent	Advantage of Nonirrigated Boxes Per Acre	Advantage of Nonirrigated Operating cost Per Acre	Advantage of Nonirrigated Operating cost Per Box	Returns above operating cost Per Acre	Returns above operating cost Per Box
Under .30	21.1	486	$141	$.29	15.1	485	$118	$.24	-10*	-1	$23	$.05	$22	$.05
.30 to .39	22.5	417	152	.37	19.3	409	117	.29	-17	-8	35	.08	24	.08
.40 to .49	19.3	378	150	.40	17.6	369	122	.33	-19	-11	28	.07	13	.07
.50 to .59	12.9	315	161	.51	15.0	315	123	.39	16	0	38	.12	38	.12
.60 to .69	7.6	302	161	.53	8.4	275	114	.41	11	-27	47	.12	9	.12
.70 to .99	10.6	231	148	.64	13.0	218	115	.53	23	-13	34	.11	16	.11
1.00 & over	6.0	166	148	.89	11.6	139	108	.78	93	-27	40	.11	2	.11

*Figures with minus sign (-) means advantage of irrigated groves.
Source: Unpublished data of the Florida Agricultural Extension Service.

Many factors involved

There are many factors involved when considering moisture for citrus throughout the year—and it is a 12-months job. Some of the factors to be considered are kind of soil, depth of soil, organic matter content, hardpan, subsoil, elevation, topography, local climatic conditions, temperature, natural and artificial drainage, water table, age of tree, stage of tree growth and fruit development, variety, rootstock, planting distances, stage of growth and kind of covercrop, irrigation cost, fruit prices, and income taxes. Due to a combination of these and other factors, some groves seldom if ever respond sufficiently to irrigation for it to pay. Other groves appear to pay well if irrigated according to needs. But a lack of proper timing and improper amount of water added might result in lower net returns than if no water had been added and the trees come through in just as good condition.

The total rainfall annually in the citrus area of Florida is usually ample for citrus production. However, the distribution of rainfall may be such that critically dry periods occur. Rainfall averaged 52.6 inches annually for the 16 seasons of 1934-50 at 15 weather stations scattered throughout the citrus area. With ideal distribution much less rainfall might be sufficient for maximum citrus production. Tree crops generally require substantial amounts of moisture and citrus is no exception. The evergreen citrus trees use moisture throughout the year with considerable variations as to the needs at different seasons and conditions.

Citrus records

In 1949-50 the Florida Agricultural Extension Service had records on 106 irrigated groves over 10 years of age and 93 groves that were not irrigated. Groves under the classification of irrigated include all groves that were irrigated and those that were usually irrigated when the management deemed it advisable to irrigate. Some groves, no doubt, received adequate

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The Future Of . . . Florida's Citrus Industry

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The position which Florida occupies among the forty-eight states today differs greatly from the position it occupied yesterday. Florida in 1952 is not the same state as that which existed fifty years ago; neither is it the same state as that which existed twenty-years ago; or even ten years ago; it has undergone a series of fundamental changes—changes that are political, social and cultural as well as economic. More than a double decade ago we ceased to be an infant state of self-sufficing farmers, or self-contained lumber-mill communities, of small isolated tourist towns and cities. We have grown up; we have achieved adulthood; we have developed into a mature state of inter-dependent manufacturing industries, of inter-connected recreational and distributing centers, of interrelated urban communities. We have attained high distinction not only in the South, but also in the nation. We have become the most unusual as well as the fastest growing state south of the Potomac and east of the Rio Grande, the Republic of Texas to the contrary notwithstanding.

I

Of great importance to the changing life and economy of Florida is the presence of the citrus industry. The citrus industry of Florida yielded products in the 1950-51 season to the gross value of approximately $230,000,000. Of the total value of all Florida fruits and vegetables amounting to $385,000,000 in 1950-51, citrus represented about 60 per cent. The value of citrus fruits in Florida exceeded by some $20,000,000 the combined 1950-51 value of livestock, poultry and eggs, dairy products and general field crops.

While comparable figures for other industries in 1950-51 are not available, Florida's factories produced goods manufactured within the state in 1947 to the total sum of $819,000,000 which is 3½ greater than the gross value of output of the citrus industry in 1950-51. In 1950, wages and proprietor's income from manufacturing in Florida was $249,000,000 and is dividends, interest and rent earned by Florida's manufacturing corporations are added thereto, Florida's total income from manufacturing in 1950 was $340,000,000. Similar income from the citrus industry was only about 38 per cent as great. In 1949-50 the gross value of citrus was $242,000,000. After deducting production and marketing cost the net return to citrus growers before taxes was $129,000,000. This net return in 1950 constituted nearly 20 per cent of all proprietor's income and nearly 4 per cent of all personal incomes in Florida.

The citrus industry provides employment for a large segment of Florida's rapidly expanding population. There are 15,000 citrus growers in Florida. There are also 293 packing houses, 40 canning factories and 19 frozen concentrate plants. The total number workers employed in the citrus industry including office workers is estimated at 56,200. As compared with the number of workers in other industries, the citrus industry ranks high. Forestry together with its allied industries employs 39,000; manufacturing plants with seven or more people on their payroll employ 88,100; non-manufacturing enterprises, 320,700; and the tourist industry, 54,000.

II

Since the citrus industry is of such great importance to the changing life and economy of Florida and since its future is held by many to be uncertain, it is necessary to know not only where this industry

is at present but also where it is going. In the high Sierra Nevada mountains of the West, there lives a hermit who from his cabin looks down in pity and bewilderment upon other men of larger aspirations. He tells a tale of his encountering a little group of Alpine climbers lost in a mountain fastness, who, upon being given their location, cried incredulously, "But how did we get here?" The Sierra hermit drily replied: "If you ain't got the answer to that question, I ain't got none that fits. If you're going anywhere in particular up here, you better figger out first how t' git there, 'cause by just goin' afore you know where you're goin', you can git to a powerful lot of places where you don't want to be."

Where the citrus industry of Florida is going depends upon several factors. To begin with, it depends upon the outflow of production. Citrus production is rapidly increasing both in Florida and in the nation. Florida leads all other states in the citrus output. Of 181,000,000 boxes of citrus fruits produced in the United States in the 1950-51 season, Florida produced 105,500,000 boxes, California 61,000,000, Texas 10,000,000 and Arizona 4,500,000. Florida's share of the total U. S. crop was 58 per cent. While United States production increased from 145,000,000 boxes in 1940-41 to 181,000,000 boxes in 1950-51, or 24 per cent, Florida's production increased from 55.8 million boxes in 1940-41 to 105.5 million in 1950-51, or 89 per cent. Of 105.5 million boxes produced in Florida in 1950-51, 67.3 million boxes were oranges, 33.2 million greatfruit, and 5 million tangerines and limes. Florida's percentage of increase in citrus production from 1940-41 to 1950-51 was more than 3½ times greater than that of the United States as a whole.

The same situation exists more or less with respect to citrus acreage. While acreage in citrus groves in Florida increased from 342,800 in 1940-41 to 438,500 in 1950-51 or 30 percent, acreage in the United States increased from 770,900 in 1940-41 to 821,000 in 1950-51 or only 6 per cent. It is estimated that as of June 30, 1951, there were 62,000 acres of non-bearing groves in Florida, that for the next four years there will be added to bearing groves an average of 15,500 acres per year and that by 1956 Florida's total bearing groves will be approxmiately 500,000 acres. Of 28.1 million citrus trees growing in commercial groves in Florida 20.1 million are orange trees, 6.5 million are grapefruit trees and 1.5 million are tangerines.

Since the production of citrus fruits is rapidly on the increase in Florida, what, if anything, may be done on the supply side of the market to control the situation and to insure continuing stability? That question is difficult to answer but is not a catch question. It seems that there is a club in New York that requires every member every year to ask every other member one question. If the member can not answer the question asked, he is fined $25. But before the fine is assessed, the member asking the question has to be able to give the correct answer; otherwise has to pay the fine. One day a member arose and asked how may a ground squirrel dig his hole in the ground without heaping up any dirt around the hole on the outside. The member to whom the question was addressed replied: "That question is silly; it cannot be answered. You will have to pay the fine." The member asking the question said: "Oh yes, it can be answered. The ground squirrel begins to dig at the bottom of the hole." The other member sputtered: "But how can the ground squirrel get down to the bottom of the hole to dig?" The member asking the original question calmly replied: "That is your question."

To bring about continuing stability in Florida's citrus industry on the supply side of the market several measures have been suggested:

1. Volume proration of fresh fruit shipments. It is argued that this would take care of all the other problems. If there is a marketing agreement and it is made effective to keep the 51st car out of a 50-car market it is contended everything would be alright. It is assumed that orderly marketing including the control of surplus would lead to the sale of more citrus because confidence would be established in our price structure and that wholesalers and retailers would push our products more vigorously. While this argument has real merit, it is necessary, as Wayne Reitz has pointed out to go beyond volume proration of fresh fruit shipments.
2. Control of surplus output. It is contended that this would do almost everything that needs to be done. But the handling of surplus at particular times during the marketing season is not enough. It is necessary to go further and to take care of surplus so that it will not result in ruinous prices for the whole crop. Consequently, an equitable method of eliminating the surplus portion of the crop or of diverting it to non-commercial uses becomes of primary importance.
3. Assessment of penalties—tax penalties or otherwise—on new plantings. This would require either legislative action or the signing of agreements that might be difficult to accomplish. Moreover, such arrangements would require enforcement procedures that are not likely to be easily administered.

All of these measures seek to influence price by influencing supply. Control of supply in the short run is the most effective means of affecting prices because "the rates of increase in supply are at times greater than the more gradual increase in demand." But even in the long as well as short run supply cannot be ignored. It must always be considered in its relationships to demand.

III

The future of Florida's citrus industry depends not only on the outflow of production, but also on the outlet to markets. Supply and demand are the ultimate determinants of price. They represent opposite sides of the price equation. Each interacts upon the other. If supply is in excess of demand it is argued that there is underproduction. But overproduction and underproduction have meaning only with respect to demand—with respect to consumption. It is contended that there is no such thing as overproduction anyway. Whether in the long run or in the short run, the problem with which we are confronted, it is insisted, is that of underconsumption. Consequently, the increasingly rapid outflow of production will be good or bad depending only upon whether or not there are increased outlets to markets—upon whether or not demand keeps pace with supply.

The demand for citrus fruits is not fixed. It is elastic; it can be changed; it can be increased—increased in several ways:

1. By extended use of advertising. Consumers require education—education designed to create desire on their part to purchase at satisfactory prices more citrus products than they have consumed in the past or than they are consuming in the present. There are three levels of consumers demand: high—where buyers know what their wants are and seek to satisfy them; middle—where buyers are clearly aware of their wants but do not know how to appease them and are ready to be told what

to do; and lower—where buyers are only vaguely aware of their wants and look for direction as to what, where, when and how much to buy. It has been said that consumers are conscious of only about one-half of their wants and want suggestions for the other half.

2. By improvement of quality of fresh and processed products through better handling in packing houses and processing plants and in channels of distribution.
3. By utilization of improved dispensers for fresh fruits, frozen concentrates and beverage bases.
4. By employment of highly developed programs of sales promotion and merchandising.
5. By inereased sales in foreign markets.

IV

The future of Florida's citrus industry depends not only on the outlet to markets but also on the outcome of national economic expansions—on the outcome of the possibilities of further economic progress. What is progress? When you are just getting used to something and somebody invents something else that you won't have time to get used to until somebody invents something else, that's progress. Progress is swapping new troubles for old. Progress is providing ourselves with bigger better circles to run around in. Progress is making more and more machines to provide us with more leisure time in which to be bored, to act foolish, to hunt for parking places or to get hurt in automobile accidents.

The United States has not yet reached the end of its golden age of growth—its economic development, its commercial and industrial accomplishments. The American system of private enterprise may have its up and downs—its alternating periods of prosperity and depression; but it is not stagnant; it is not stymied; it is not standing still; it is not on the way out. The age of American conquest is not over. We have not done everything that needs to be done. While the future may be uncertain at particular points, it will present us with more challenging opportunities than either the present or the past. Our quest for a better order of things has only just begun. Hence we cannot afford to pause hesitantly now; to put aside promises of further progress; or to be upset by the false prophets of gloom, of doom or even of the possibility of a bust or a runaway boom.

In his book entitled **Controlling Factors in Economic Development,** published in 1949, Dr. Harold G. Moulton argued that the natural resources and productive capacity of the United States could, in 2049 or 100 years hence, support a population of 300,000,000 at a standard of living eight times as high as that which existed in 1949. In this bright future, each American, Dr. Moulton goes on to say, would be able to spend eight times as much as he spent in 1949 for food, 16 times as much for housing, 20 times as much for clothing and 33 times as much for recreation and travel.

Further proof of prospects of industrial progress in the United States may be found in the report of the President's Materials Policy Commission published in June, 1952. In this report, it is predicted by the Commission after eighteen months study that the need for industrial raw materials would increase 50 to 60 per cent by 1975 to support a doubling of the gross national product to an annual rate of $566,000,000,000, a population of 193,000,000 and 20,000,000 increase in the working force of this country to 82,000,000. With this prospective increase in the number of people gainfully employed and with the doubling of the gross national product, the demand for citrus products and other consumers' goods as well as the demand for producers' goods may be stepped up to levels undreamed of in the present. Indeed by 1975, it may be necessary to double the output of Florida's citrus industry in order to take care of the demand of consumers.

V

Finally the future of Florida's citrus industry depends on the outlook for private business enterprise. Private business which is based on freedom of contract, free play of individual initiative, private ownership of wealth, and motivation of private profits is no longer private; it is no longer free to pursue its own policies; it is no longer permitted to put its own programs into effect unmolested. As Summer Slichter of Harvard has pointed out, a series of important changes have occurred in the first half of the Twentieth Century which fundamentally affect business management—fundamentally affect the operation of private business units everywhere.

These changes are of three kinds:

1. The transformation of the economy of the nation from that of free private to that of government guided enterprise. In earlier days when a neighbor dropped in for a call instead of calling in for a drop, when a dollar would purchase a basketful of groceries and when I did my courting in a horse and buggy rather than a convertible, it was believed that private business could be trusted to run itself; that since labor and capital could freely move from one industry to another, people would be able to get the kinds and qualities of goods and services produced which they wanted; and that competition would always keep quality up and prices down. At present, these notions no longer prevail. It is government controls and public policies, not the drive of private profits, that determine what and how much is produced at present, what incomes and how much are received and what labor and capital may do or may not do.
2. The development of the welfare state. The welfare state is founded upon the payment of incomes according to needs rather than according to productivity. Provisions are made by government for old age pensions, for unemployment and sickness insurance, for education of everybody, for taking care of the widows and orphans and for relief of other persons of varying disabilities. Too often what has been done is in the form of handouts and to get votes rather than to meet the legitimate needs of those who really deserve public assistance.
3. The shift of power from employers to employees. Business managers no longer hold undisputed sway. Their influence has declined. The strength of labor unions has increased. Since the number of wage earners and salaried workers has so expanded that "three out of four persons in the United States are on someone ele's payroll," those workers demand of employers more and more participation in the affairs of business management.

But as a result of these changes the American system of free enterprise which has attracted the best of American brains in the past, which has made this country the most powerful industrial nation in the world and which has provided us with standards of living unsurpassed by any other parts of the earth is under fire today—under fire from many quarters. There are those within our gates who would abolish this system altogether and who would substitute therefor other systems—systems which are alien to the ways of Americanism. Due to the presence of mistaken idealists and the militant maneuvers of misguided minorities, even some businessmen are

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Costs Of Picking And Hauling Florida Citrus Fruits---50-51 Season

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Costs of handling citrus fruit, from the tree to the processing plant, for the 1950-51 season are summarized for nine operators by type of fruit. Services studied were buying and selling, picking, which included delivery to the roadside, and hauling from roadside to the processing plant. All of the firms, except two, were specializing in this kind of business. Two were located in Lake County, five in Polk, one in Hillsborough and one in Orange County. Their total volume for all services performed ranged from 380,000 boxes to slightly more than 3,000,000 boxes. No sampling procedure was used in determining the cooperators and it is not known how well the group obtained represents the industry. All, perhaps, were above average in size of operation.

Data were obtained only from firms with detailed records of actual cost. A few items of cost were divided by estimation in order to obtain uniformity of accounts, but total costs were not changed from the book record. Some operators had good financial records, but no record, or incomplete record of the number of boxes of each type of fruit handled, and were, therefore, not used in the summary.

The following is a brief explanation of how costs were allocated to the various services performed, and distributed by types of fruit. Costs were first obtained in total from the records, such as total labor, repairs, telephone and telegraph. If more detail was needed on total costs, they were further analyzed from subsidiary records or by estimation of the operator. Labor was subdivided into classes from payroll records and piece rates.

Next, total costs were allocated to three departments or types of operation: (1) buying and selling, (2) picking with own crews, (3) hauling, own trucks. Some costs fell naturally into these categories; the management was asked to estimate the allocation of some others. Buying and selling costs, and hauling costs were not separated by type of fruit. Contract picking and hauling costs were mixed, both as to services performed and type of fruit included, and are not shown in the summary.

Finally, costs allocated to picking fruit were further subdivided by type of fruit picked, into oranges, grapefruit and tangerines. Labor costs for picking were distributed by type of fruit from an analysis of the picking payroll, and from piece rates for all piece-rate workers. Other cost items were prorated to the three types of fruit in inverse order of the estimated average number of boxes a picker could pick in a day as estimated by the operators. This resulted in higher per-box costs for tangerines and lower per-box costs for grapefruit than a straight box-basis proration would have given.

An illustration of how this works is given below:

Type of fruit	Actual No. of boxes picked	Percentage distribution	Estimated number boxes picked per worker per day	Adjusted number of boxes*	Percent distribution used in prorations
(1)	(2)	(3)	(4)	(5)	(6)
Oranges	200,000	50.00%	65	307,692	54.47%
Grapefruit	180,000	45.00%	90	200,000	35.41%
Tangerines	20,000	5.00%	35	57,142	10.12%
Total	400,000	100.00%		564,834	100.00%

*Column 2 + by column 4 x 100.

For a firm which picked 400,000 boxes of citrus, distributed by type of fruit as shown above, 54.47 percent of the citrus picking costs (except labor) would have been charged to orange picking instead of 50 percent. It will be noted that tangerine picking would have borne 10.12 percent of the overhead costs instead of only the 5 percent which a stright box volume would have given.

The rate of picking the various types of fruit, as estimated by the firms, with oranges as 100% averaged as follows:

Type of fruit	Relative picking rate
Oranges	100.0
Grapefruit	133.6
Tangerines	55.5

The average costs per box for 1950-51 for nine firms, engaged primiarly in picking and hauling citrus fruit from the grove to the cannery, are given in Table 1 by type of service performed.

The average volume bought and sold by seven firms was 946,780 boxes. Some of this was hauled by contractors and some by the firms' own trucks. Nine firms hauled an average of 617,326 boxes with their own trucks from the grove to the cannery during 1950-51. Fruit picked by eight firms averaged 529,411 boxes each. Of this 72.3 percent was oranges, 26.4 percent grapefruit and 1.3 percent tangerines. Only four of the eight operators picked tangerines with their own crews.

Buying and selling cost of citrus includes the salaries and brokerage paid buyers, car expense, telephone and telegraph, a portion of the management and office salaries and general overhead expenses.

Hauling costs include all drivers'

and mechanics' wages, truck expense and a portion of management and overhead costs. Contract hauling was eliminated, except in two cases where small amounts were left in, because the number of boxes was not determined.

Picking costs include all amounts paid labor for picking and delivery to the roadside, grove truck expense and a portion of the management and general overhead expense. Picking labor was allocated to the types of fruit from payroll analyses and piece rates. Costs for workers not paid on a piece rate were prorated on an adjusted volume basis as illustrated on page 2. The average cost per box of 17.61 cents for orange pickers as shown in Table 1 represents a composite of all rates paid during the season. Most operators reported paying 15 cents per box for picking budded oranges and nine cents per box for grapefruit early in the season, with increases up to 17 cents on oranges and 10 or 11 cents on grapefruit later in the season. Rates for picking seedling oranges were higher than for budded fruit and varied from 20 to 30 cents per box. A rate of 12 cents per box was noted on a few grapefruit. It was not practical to separate the picking costs of budded and seedling oranges, but budded oranges were the type predominately picked by all operators.

Miscellaneous expense in Table 1 includes many small items, such as freight and express, loss on employee advances, some supplies, travel and entertainment, advertisement and public relations, dues, subscriptions, donations, legal and auditing, and social security and workmen's compensation taxes.

When the business was operated by the owner and the management was unpaid, an estimated amount was added as management compensation. Some of the firms had paid management.

The total cost for buying and selling, picking and hauling citrus from the grove to the processing plant in 1950-51 averaged 42.51 cents for oranges, 32.77 cents for grapefruit and 71.08 cents for tangerines. Only a very small sample of tangerines was obtained. For picking only and delivering to roadside, costs averaged 28.36 cents for oranges, 18.62 cents for grapefruit and 56.93 cents for tangerines.

Hauling costs averaged 10.31 cents per box for all types of fruit. Oranges weigh more per box than grapefruit, and thus the cost of hauling should be somewhat more for oranges than grapefruit. Tangerines require more careful handling and lighter loading than other fruit and are the most expensive type to haul.

Buying and selling costs averaged 3.84 cents per box for all types of fruit.

None of the cost in Table 1 includes interest on invested capital. Interest paid by the firms for use of operating capital is included, though only about half the firms had interest expense.

Capital invested in land, buildings, trucks and other equipment averaged $86,117.00 per firm for six firms or $91.95 per 1,000 boxes handled. The volume here was taken as the total number of boxes on which any service was performed. Interest at 5% on this would amount to about one-half cent per box.

(Continued on page 10)

Table1.—Average Costs Per Box of Picking and Hauling Citrus Fruit, 1950-51 Season

	Buying & Selling	Hauling	Picking			All Operations: Buying & Selling Picking & Hauling		
			Oranges	Grapefruit	Tangerines	Oranges	Grapefruit	Tangerines
Number of Operators	7	9	8	8	4			
Average Volume—boxes	946,780	617,326	382,661	139,598	7,152			
			Cost Per Box—Cents					
Labor:								
Field Foreman			1.36	1.20	2.45	1.36	1.20	2.45
Pickers			17.61	10.22	38.48	17.61	10.22	38.48
Leaders			2.07	1.88	2.45	2.07	1.88	2.45
Grove Drivers			1.07	.80	2.43	1.07	.80	2.43
Highway Drivers		2.23				2.23	2.23	2.23
Mechanics	.01	.26	.10	.05	*	.37	.32	.27
Other		.06	.12	.12	.05	.18	.18	.11
Total Labor	.01	2.55	22.33	14.27	45.86	24.89	16.83	48.42
Gasoline, Oil, Grease	.06	1.93	.69	.46	1.49	2.68	2.45	3.48
Repairs	.07	2.01	1.25	.94	3.06	3.33	3.02	5.14
Licenses, Taxes, Bonds	.02	.30	.17	.12	.17	.49	.44	.49
Insurance	.02	.35	.24	.17	.46	.61	.54	.83
Depreciation	.09	1.44	1.11	.81	1.88	2.64	2.34	3.41
Interest—Operating	.03	.04	.04	.02	.07	.11	.09	.14
Equipment Rental	.01	.23	.12	.07	.32	.36	.31	.56
Contract Hauling		.17				.17	.17	.17
Miscellaneous Expense	.57	.27	.75	.53	.46	1.59	1.37	1.30
Salaries:								
Management	.76	.62	1.12	.84	2.14	2.50	2.22	3.52
Office	.17	.24	.38	.27	.79	.79	.68	1.20
Buyers & Brokerage	1.80	.04				1.84	1.84	1.84
Office Supplies	.03	.03	.04	.03	.03	.10	.09	.09
Telephone & Telegraph	.18	.07	.09	.07	.19	.34	.32	.44
Lights & Water	.02	.02	.03	.02	.01	.07	.06	.05
Total	3.84	10.31	28.36	18.62	56.93	42.51	32.77	71.08

*Less than .005 cents.

Table 2.—Frequency Distribution of Cost Per Box for Picking Oranges and Grapefruit, 8 Firms, 1950-51 Season.

Total cost per box	Oranges	Grapefruit
(Cents)	Number of Firms	
16—19.99		5
20—23.99		3
24—27.99	5	
28—31.99	2	
32—35.99	1	
Total number of firms	8	8
Average cost per box	28.36c	18.62c

Table 3.—Frequency Distribution of Cost Per Box for Hauling Citrus Fruit From Grove to Cannery, 9 Firms, 1950-51 Season.

Cost per box	Number of firms
(Cents)	(Number)
6— 7.99	2
8— 9.99	4
10—11.99	
12—13.99	1
14—14.99	2
Total number of firms	9
Average cost per box	10.31c

COSTS OF PICKING AND HAULING FLORIDA CITRUS FRUITS, 1950-51 SEASON

(Continued from page 9)

Revenue from sales of fruit and services was obtained from most of the firms but it could not be divided by type of fruit or service performed. Two of the nine firms showed a loss on all operations for 1950-51, two were very near the break-even point and two were not obtained. From rates which were reported as current in the industry as a basis for estimating costs and prices, it appears that most operators who made a profit, made it from the operation of buying and selling fruit. This was hazardous and resulted in some losses but also seems to have been the principal source of profit.

Only one record was found from which it was possible to compare the number of field boxes picked with the number of boxes sold, cannery weight. In this case the oranges sold during the season were 2.7 percent more than the boxes picked, but grapefruit sold were 0.2 percent less than picked.

Variations in total costs per box for the various services are shown in Tables 2, 3 and 4.

Table 4.—Frequency Distribution of the Total Cost Per Box for Buying and Selling, Picking, and Hauling Citrus, 1950-51 Season.

Total cost per box	Oranges	Grapefruit	Tangerines
(Cents)		Number of Firms	
24—29.99		2	
30—35.99	2	3	
36—41.99	3	1	
42—47.99	2	2	
48—54.99	2		
54—59.99			1
60—65.99			
66—71.99			2
72—77.99			
78—83.99			1
Total number of firms	8	8	4
Average cost per box	42.51c	32.77c	71.08c

AHS:fw—1/12/52
Exp. Sta., Ag. Ec. — 50

CONTROL OF PURPLE SCALE ON CITRUS WITH PARATHION

(Continued from inside front cover)

Florida over a 4-year period. In one experiment where oil emulsion gave better control the difference was slight and nonsignificant.

For heavy infestations, particularly on grapefruit and Temple orange trees receiving copper and nutritional sprays, the minimum effective concentration was 2 pounds of 15-percent or 1 pound of 25-percent wettable parathion per 100 gallons of water. Two applications a year were sometimes necessary, especially if the first spraying was done early in the spring.

For light infestations 1 pound of 15-percent wettable parathion per 100 gallons was satisfactory if applied with thorough coverage. Two sprayings a year with this lower concentration gave better year-around control than a single spraying. Parathion emulsion concentrate gave control comparable to that from parathion wettable powder.

Parathion was found to be compatible with wettable sulfur, basic copper sulfate, and certain summer miticides, and so can be used in combination sprays. It thus has a distinct advantage over oil emulsion, which is incompatible with the routine sulfur sprays and must be applied separately. The elimination of one or more applications from the annual spray program would more than offset the higher cost of the parathion.

Parathion was used in spring, summer, fall, and winter months with no damage to grapefruit or orange trees or fruits. Fruits from trees sprayed with parathion were bright in color and high in external and internal quality. No external residues of parathion were detected at picking time, nor was any parathion found in the juice, but a minute quantity remained in the peels. Trees sprayed late in the year with oil were much inferior in quality to the parathion-sprayed or the unsprayed trees.

For control of heavy infestations late in the year, parathion was a satisfactory material.

THE FUTURE OF FLORIDA'S CITRUS INDUSTRY

(Continued from page 7)

inclined to make excuses, if not to apologize outright for their money-making.

But no excuses as to money making are necessary. Money making is not a transgression of divine law; it is not sinful; it is not something to be condoned; it is not a species of human conduct that leads to moral degradation. It is an undertaking that is essential to attainment of the good life—or at least to the attainment of the good things of life. The time has come, I think, for businessmen everywhere to go on the offensive—to go on the offensive in favor of profit making; in favor of the old fashioned virtues of hard work, of saving and investing, and of balancing budgets whether public or private; for after all, the best defense whether in business, in football, in war, or anywhere else is a strong and vigorous offense.

Entirely too characteristic of the present, to be wholly facetious, is the reply of a father to his son which is contained in the following verses:

"Father, must I go out to work?
No! No! My darling son,
We're living now on Easy Street
With funds from Washington.

We're cared for now by Uncle Sam
So don't get exercised,
We do not need to care a damn
Because we're subsidized.

But if he's going to treat us well,
And give us milk and honey
Please tell me, Daddy, where the hell
He's going to get the money?

Don't worry Child, there is no hitch
About this glorious plan
He'll get the money from the rich
To help the Common Man.

But, Father, won't there come a time
If we take all their cash
And they are left without a dime
When things will go to smash?

Son, you need a lot of seasoning,
You nosy little brat
You do too damn much reasoning
To be a Bureaucrat."

CITRUS INSECT CONTROL FOR SEPTEMBER 1952

(Continued fram page 3)

since spring.

Wherever scale control is needed a combination spray of 1 to 1 2/3 pounds of parathion plus 5 to 6 pounds of sulfur per 100 gallons is recommended. Oil sprays can be used but an application made in September is very likely to adversely affect the solids and retard coloring of the fruit for 8 to 12 weeks.

Timely Suggestions: Check the tops of trees for rust mite and scale. The tree top is the most exposed part of the tree to rain and wind but it receives the least amount of spray and dust.

Keep up the control of rust mites on young trees to prevent greasy spot and a subsequent leaf drop during the winter.

For more detailed information refer to the 1952 "Better Fruit Program" or consult the Citrus Experiment Station at Lake Alfred or Fort Pierce.

Reduction of Organic Matter In Citrus Press Liquor...

By Aerated Yeast Propagation

M. K. VELDHUIS
U. S. CITRUS PRODUCTS STA., a/
WINTER HAVEN

AT ENGINEERING CONFERENCE IN GAINESVILLE, MAY 20

The production of feed yeast (**Torulopsis utilis**) from certain waste liquors has interested many investigators because it offers a means of disposing of the wastes and at the same time obtaining a product which would pay at least part of the cost of operation and, under favorable conditions return a profit. The yeast produced is high in protein, rich in the B-complex vitamins, and valuable for use in feeds.

These investigations were undertaken at the U. S. Citrus Products Station on the production of citrus waste material in an effort to provide an additional outlet for citrus press liquor. Usually this liquor has been made into a molasses at some expense and sold for use as feed, but at times this operation has not been profitable. A batch system of yeast propagation was investigated and this was reported upon in 1942 (1). A summary of later work in cooperation with the Dr. P. Phillips Canning Company, Orlando, Florida, using a continuous method and equipment developed at the Southern Regional Research Laboratory was published in 1948 (2). Additional work was done with the continuous system of yeast propagation and the results on the utilization of the organic matter during these studies are to be summarized here.

EXPERIMENTAL

The large propagator had a total capacity of 800 gallons and was capable of holding about 500 gallons of fermenting liquid during active aeration. Air as fine bubbles was admitted through porous aloxite tubes fitted in the bottom of the propagator. After the initial build-up of culture in the propagator, the nutrient medium prepared from citrus press juice was added con- At the same time, an equal volume of yeast slurry was drawn continuously from the propagator.

a/ One of the laboratories of the Bureau of Agriculture and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

tinuously at a predetermined rate. Yeast was recovered by centrifuging and drying the concentrated slurry on a drum drier.

In some of the experimental work, a smaller propagator of 6-gallons capacity was used. The air was distributed by means of a tube with 1/16 inch holes instead of with aloxite tubes.

The press liquor used in the yeast propagation was obtained during the commercial manufacture of citrus feed from waste citrus canning peel. It had a soluble solids content of 8 to 10% (Brix), of which about two-thirds consisted of sugars. The press liquor was diluted with water in some cases to obtain the desired strength. In order to obtain efficient yeast production ammonium sulfate was added to provide an ample supply of nitrogen in available form and trisodium phosphate was added to furnish phosphorus. The pH during propagation was about 4.0 and could be varied within limits by varying the ratios of the two nutrients.

Analyses were made to determine the amounts of sugar utilized, and amounts of yeast produced. In some cases, the reduction in the Oxygen Consumed value was estimated. In still other cases, the reduction in non-volatile organic matter and the production of volatile organic matter were determined. Yeast yield was determined by separating the yeast, drying, and weighing. Non-volatile organic matter (soluble) was estimated by removing any yeast or other suspended matter, drying under vacuum at 70°F., weighing, ashing, weighing again, and noting the loss in weight. Volatile organic matter was estimated with an Ebulliometer and expressed as ethyl alcohol. Conventional methods were otherwise employed.

In the first series of experiments, the small propagator was used and the strength of the feed was varied from 1.5° Brix to 6.6° Brix and the effect on utilization of sugars, reduction in non-volatile organic matter, Oxygen Consumed value, and yeast yield noted.

In the second series of experiments, the large propagator was used and the feed rate varied from 92 gallons per hour to 234 gallons per hour, and the effect noted on utilization of sugars and yield of yeast.

In the third series of experiments, the large propagator was again used and some results have been selected, showing the effect of yeast growth under favorable conditions on sugar utilization, non-volatile organic matter, Oxygen Consumed values, yield of volatile

TABLE 1. Effects of varying the concentration of feed to the yeast propagator. 1/

Brix of feed	Sugars in feed	Sugars used	Non-volatile organic matter decrease	Oxygen Consumed value decrease	Yeast yield 2/
° Brix	%	%	%	%	%
1.5	0.6	94	65	71	70
2.5	1.3	96	63	73	65
3.6	2.0	94	51	60	44
4.6	2.0	95	49	66	32
5.5	2.1	95	51	74	23
6.6	3.8	97	50	62	26

1/ Detention time in propagator – 3 hours; Aeration rate – 0.27 cu. ft. per gallon per minute.
2/ Based on sugars in feed.

organic matter, and yeast yield.

RESULTS

In Table I, the results of the first series of experiments are given. Varying the concentration of the feed to the small propagator from 1.5° Brix to 6.6° Brix, in intervals of approximately 1° Brix, had no significant effect on the percentage of sugar utilized. Utilization of the sugars was 94% or more in all cases. The values for non-volatile organic matter show no material differences with increase in strength of feed. There were some variations, but these are normal for this type of work. The yield of yeast was highest with the more dilute feed to the unit and increased rapidly with higher concentrations. From the standpoint of efficient yeast production, it would appear advisable to keep the concentration at 2.5° Brix or below, but if the main purpose was to decrease the sugars or organic matter, and yield of yeast was secondary, higher concentrations might be preferable.

Data from the second series of experiments are given in Table II, showing the effect of varying the rate of feed. In the first four runs where the feed rate was increased from 92 to 184 gallons per hour, no marked difference in the percentage utilization of sugars was observed, but with a feed rate of 234 gallons per hour, the dilution with feed exceeded the growth rate, the culture became diluted, and substantial quantities of sugar appeared in the effluent. The results with the sixth and seventh runs indicated a return to normal with reduced feed rate. These results indicate that a detention time of at least 2½ hours in the propagator is necessary to maintain satisfactory yeast propagation. In the eighth run, the strength of the feed was decreased by dilution with an equal amount of water. This illustrated again the increased yield with dilution and destruction of about the same percentage of sugars.

In Table III, some results are given with the large propagator with yeast propagation under favorable conditions. In these experiments, the utilization of the sugar was complete and about two-thirds of the organic matter destroyed as illustrated by the Oxygen Consumed value and non-volatile organic matter values. A small amount of volatile organic matter was obtained in all cases.

Since some volatile materials were obtained with quite efficient yeast production, it was thought that the values might be even higher with high concentrations of feed and low yields of yeast. All the product was collected over a 72-hour period and the volatile organic matter distilled. The yield of volatile organic materials collected in this manner represented 30% of the sugars originally present and consisted of over 90% ethyl alcohol. Thus even with aerated yeast fermentation, considerable quantities of alcohol may be expected under certain conditions.

Application has been made of the yeast propagation as a preliminary step to a methane fermentation in citrus wastes of about 1% total solids by McNary and co-workers (3). Rapid continuous propagation of yeast has possibilities in reducing the sugar contents of other citrus effluents as a preliminary step to other methods of disposal.

TABLE II. Effects of feed rate on utilization of sugars and yield of yeast.

Feed rate	Aeration rate	Sugars in feed	Sugars in effluent	Yeast yield 1/
	Cu. ft./			
gal/hr.	gal/min.	%	%	%
92	0.56	5.8	0.62	33
139	0.36	5.3	0.43	34
131	0.27	5.7	0.63	36
184	0.27	5.9	0.31	35
234	0.27	6.0	2.44	32
184	0.29	5.4	0.53	33
129	0.25	5.8	0.25	34
139	0.24	3.1	0.11	49

1/ Based on sugars in feed.

TABLE III. Utilization of organic matter under favorable conditions for yeast growth.

Feed rate	Aeration rate	Sugar utilization	Non-volatile organic matter decrease	Oxygen Consumed value decrease	Volatile organic matter	Yeast yield 1/
	Cu. ft./					
Gal/hr.	gal/min.	%	%	%	%	%
139	0.27	–	–	68	0.26	–
147	0.28	–	66	79	–	–
142	0.34	100	–	–	0.17	49
138	0.19	100	65	81	0.18	63
140	0.44	–	–	69	0.27	–
161	0.30	100	–	79	0.35	50

1/ Based on sugars in feed.

SUMMARY

Some typical results showing the effectiveness in decreasing the amounts of sugar in citrus press liquor of a continuous method of yeast propagation with **Torulopsis utilis** have been given. The action is rapid and can be completed with a detention time of 2.5 to 3 hours. The depletion of sugars is virtually complete under a wide range of conditions, however under some conditions, in addition to yeast, which is removed with a centrifuge, substantial quantities of volatile materials (alcohol and esters) may be formed. The yeast propagation rapidly utilizes the sugars which constitute about two-thirds of the soluble solids in citrus press liquor. The remaining organic materials are likely to consist of pectin, pectic degradation products, glycosides (naringin and hesperidin), and salts of citric acid.

REFERENCES

1. Nolte, H. J., von Loesecke, H. W., and Pulley, G. N. Feed Yeast and Industrial Alcohol from Citrus Press Juice. Ind. Eng. Chem. 34, 670-73 (1942).

2. Veldhuis, M. K., and Gordon, W. O., Experiments on the Production of Feed Yeast from Citrus Press Juice. Proc. Fla. State Hort. Soc. 61, 32-36, (1948).

3. McNary, Robert R., Wolford, Richard W., and Patton, Vincent D. Experimental Treatment of Citrus Waste Water. Food Technol, 5, 319-323 (1951).

DOES GROVE IRRIGATION PAY? YES AND NO

(Continued from page 4)

moisture added. Others were irrigated less adequately. The average yield of the 106 irrigated groves was 291 boxes at 30 years of age. The nonirrigated groves had an average yield of 366 boxes at the same age, a difference of 75 boxes in favor of the nonirrigated groves. Production costs were higher per acre and per box on the irrigated groves, resulting in returns above operating costs per acre being $169 lower on the irrigated groves. The price of fruit averaged $1.95 per box on all these groves.

The 1949-50 season was the second within the past 13 seasons (1937-50) when irrigated groves failed to produce higher yields than nonirrigated. The average for that period was 10 boxes higher on irrigated groves. These 10 extra boxes of fruit did not pay irrigation costs and other added expenses on irrigated groves. Costs on irrigated groves were higher and returns above operating costs averaged $29 less per acre on the irrigated groves over the 13 seasons of 1937-50.

The cost of irrigation for the 106 groves in 1949-50 averaged $26 per acre which was 16 percent of operating costs. Irrigation cost varied from nothing on some groves that did not need irrigating during 1949-50 to $124 per acre on one grove. There were 17 groves, 16 percent of those irrigated, that had irrigation costs in excess of $40 per acre. Irrigation costs averaged $16 per acre or 9 percent of operating cost over the 9 seasons of 1941-50. This was 4 cents per box.

Other indications

It was thought that perhaps the growers who owned their own irrigation equipment through better timing of the operation, not being rushed for use of equipment on other groves, more personal interest and pride, and other reasons, that possible this group might have had better results from irrigation than those renting equipment. However, the results showed the rented equipment group had a slight advantage in net returns.

It was also thought that possibly the age of the tree might have some bearing on results obtained from irrigation but our data show no advantage from irrigation at

any bearing age as measured by averages of groups of groves.

Expenditures for fertilizer materials

Added plant food elements in the form of commercial fertilizer is very important in Florida. Using the amount of money spent per acre for fertilizer materials in grouping these groves into 10 paired groups for the 9 seasons of 1941-50, the lowest paired group, under $20 per acre spent for fertilizer materials, showed an advantage of $44 per acre in returns above operating cost for the irrigated group. The second lowest, $20 to $29 spent per acre for fertilizer materials, showed an advantage of $17 per acre for the nonirrigated. The third lowest group, $30 to $39 for fertilizer, showed $3 per acre advantage for the irrigated. The other 7 groups showed advantages for nonirrigation of from $2 in the fourth group to $334 in returns above operating cost in the tenth paired group, which was the one with $100 and more spent for fertilizer materials per acre.

This indicates that on groves that received less than $20 per acre in fertilizer materials, there was an advantage of $44 on the irrigated groves. There was little difference in the next three groups, $20 to $29, $30 to $39, and $40 to $49 spent for fertilizer, with two of these groups showing slight advantages for nonirrigation. The remaining 6 groups showed decided advantages in returns above operating cost of the nonirrigated. To me this indicates that irrigation paid on the average grove that received small amounts of fertilizer. It also indicates that irrigation was only a partial substitute for fertilizer. The evidence here is that had the irrigated groves that received small amounts of fertilizer had the amount of the irrigation cost spent for additional fertilizer, it would have been more profitable. For groves on which more than $50 per acre was spent for fertilizer materials, irrigation did not pay on the average grove as it was practiced. There is no way of knowing what the results might have been had the irrigating been done differently.

Nitrogen per box

Some growers add nitrogen to their grove proportionate to their estimate of the yield. Conversely, nitrogen per box of fruit is often used as a measure of efficiency obtained from the nitrogen added to the grove. These groves were sorted into 7 groups on the basis of nitrogen added per box of fruit harvested. These groupings are shown in the accompanying table. Over the 13-year period of 1937-50 there were 1,268 groves that were irrigated and 1,724 nonirrigated. Proportionately, there were more irrigated groves in the groups low in pounds of nitrogen per box of fruit. This also means that higher proportions of the nonirrigated groves were in the groups high in nitrogen applied per box of fruit. But the added cost of irrigation counter balanced this advantage to the point that returns above operating costs in each of the 7 groups was higher on the nonirrigated groves.

The added efficiency of nitrogen by irrigation to produce more fruit to a pound of nitrogen applied was not sufficient to off-set the added cost involved, resulting in all nonirrigated groups being more profitable per acre and per box than the corresponding irrigated groups. It cost more per acre and per box over this period to produce fruit on these irrigated groves at all levels of nitrogen efficiency. So much so that each corresponding

group was more profitable per acre and per box in the nonirrigated groves.

Restatement

To emphasize by means of repetition—irrigation, if practiced, is another grove operation that needs to be timed and applied according to the needs of the individual grove. Some groves seldom if ever respond sufficiently to irrigation for it to pay. Other groves appear to pay well if irrigated when needed in the correct amount. But a lack of proper timing and too little or too much water added might result in lower net returns than if no water had been added and the trees come through in just as good condition. If and when more care is excersied in the determination TABLE—Cost and Efficiency ..... of the exact time for irrigation and more is known about the proper amount of water to add, it is entirely likely that it will pay more than under haphazard and guessing methods.

Suggested procedure

With continuing high costs of labor, materials, and equipment, all operations should be done as efficiently as possible, including irrigation. In addition where irrigation is practiced, it would be wise to leave a representative corner of about 4 trees by 4 trees—a total of 16 trees—on which no water is to be added. Treat the entire grove the same with the exception of leaving off the addition of any water on these test trees. Continue indefinitely the practice of not irrigating these same trees. Check difference in yields, costs, and returns. Thus prove to your own satisfaction whether or not it actually does pay to irrigate citrus in your grove. At the same time strive to learn more about when to irrigate, how much water to apply, and how to irrigate more efficiently.

RESEARCH TO IMPROVE BREVARD CITRUS WILL GET UNDER WAY SOON

A research and demonstration program for increasing production and improving the quality of Brevard County citrus will begin in the fall with fertilization experiments on high alkaline soils, according to County Agent James T. Oxford.

Plans for the program, which will continue over a period of five years, were made at a recent meeting of the county agent and other representatives of the Agricultural Extension Service and the Fort Pierce Experiment Station of the University of Florida.

Five acres of Pineapple oranges near Titusville and five acres of Valencia oranges in the Cocoa section have been selected for the experimental work. Nitrogen, potash, and magnesium will be used in the Desearch. After the first year the fruit will be measured and tested for size and quality. The research will be done by the Fort Pierce Experiment Station.

NEW U. S. STANDARDS FOR FLORIDA ORANGES

New U. S. standards for grades for Florida oranges have been announced by the U. S. Department of Agriculture. Existing U. S. standards cover both Florida and Texas oranges. The new standards for Florida oranges only will continue in effect for Texas oranges.

Unanimously approved at a public hearing held by the Florida Citrus Commission May 9, 1952, at Lakeland, the new standards differ from existing standards principally in the following respects:

1. In the U. S. No. 1 grade, the new standards reduce permitted tolerance for discoloration from 20 per cent to 10 per cent and change the requirement "free from damage by buckskin" to 'from from buckskin or similar type discoloration."

2. Change the definition of damage by green spots or oil spots, and damage by scale.

3. Change the pack sizes to agree with actual count, and define diameter and maturity in the standards.

The new standards include other minor changes from existing standards and the rewording of a number of definitions for clarification.

The LYONIZER

Department

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

HILLSBOROUGH AND PINELLAS COUNTIES
J. A. Hoffman

During the past month many growers have completed their oil and parathion sprays for purple and red scale. Rust mite have been a lot heavier in Pinellas county than in other counties. Growers there have been taking extra precautions to keep the mite under control.

There has been a normal amount of rainfall in most sections, while few sections have had light and scattered showers.

Numerous growers are removing dead wood and water sprouts from their trees and are preparing for fall cultivation.

HIGHLANDS AND POLK COUNTIES
J. T. Griffiths and J. K. Enzor, Jr.

August has been a quiet month as far as the citrus industry is concerned. While rains have been abundant in most areas, temperatures have been high and some groves in Polk oCunty have actually been irrigated. The somewhat dry conditions should contribute to high solids and early maturity. In a few instances grapefruit is being checked for maturity and growers are hoping to pick some fruit by mid-September.

Red scale is beginning to show up in a few groves and rust mite continue to be a general problem. Both insects should be watched as heavy infestations can arise rapidly.

PASCO AND E. HILLSBOROUGH
E. A. McCartney

We have been having plenty of rain throughout this section since last month's report. Groves are in good condition and are putting out new growth. With a few exceptions there is a good crop of fruit, grapefruit is a little light. Most growers have done a good job of spraying with oil and scale seems to be under control. Oil spray was continued up until Aug. 15th in some cases due to the heavy rains. Rust mite is showing up in some places and preparations are being made to dust or spray for this.

Vegetable growers are getting ready for the fall crop which will be as much acreage, if not more, than last season.

Pasture fertilization has been and continues to be very active and more acreage each year is being developed.

WEST CENTRAL FLORIDA
J. E. Mickler

For the most part the citrus business this past period has been one of rest. Watchful growers continue to be wary of rust mites, and some control measures have been necessary, but for the better part of growers things have been quiet. Fruit in this section are sizing up nicely, and the majority of groves show the care given them.

Pasture men are now beginning to think in terms of the coming fall and haying time will loom large for many that plan for extra winter food. As in any endeavor, high quality is still the paramount need in haying operation. Those that include an adequate fertilizer application in the hay program will receive the quality needed as well as added tonnage.

Melon growers are beginning to break new ground for next season, and while it would seem that time is far away, as we have heard, it is later than you think.

SOUTH POLK, HIGHLANDS, HARDEE AND DeSOTO COUNTIES
C. R. Wingfield

For the last month we have had rains at regular intervals to insure good moisture conditions at this time. Citrus continues to look good from the standpoint of growth, tree color and fruit sizes.

The new crop appears to be fairly normal with some groves showing heavy crops of early varieties.

Chopping has been under way where the cover crops are sufficiently seeded to insure next year's cover crop. This operation will tend to stimulate the tree.

Periodical checks for insects should be made and kept under control. Rust mite can mark fruit quickly which will keep it from being moved into the fresh fruit markets.

Judging from the preparation being made for the vegetable plantings, it will be very heavy. However, many things can happen to prevent the prepared lands from being planted.

SOUTHWEST FLORIDA
Eaves Allison

This is the time of year when we can begin to see what our grapefruit crop is really like. In this area there seems to be from a half a crop up. And speaking of grapefruit, one of our growers netted two dollars and a quarter on the tree for his crop, which he simply held onto, and took care of, until the price went up. That good ol' Lyons Fertilizer helped him do this!

The orange crop seems fair, with the usual good quality evidenced in this section. There is a good volume of good clean fruit showing up on the well cared for groves.

Vegetable seed beds have gone in at this writing, August 18th, and new land has been made ready for the next crop. Gladioli growers are getting ready to put in their early plantings of bulbs, cattle are fat and many more acres of improved and fertilized pasture are flourishing where once nothing grew but palmetto and pine. Altogether, the optimism that preceeds a new season prevails in the land, and the first hurricane of the season has been reported off the coast of Africa, which is a good place for it.

NORTH CENTRAL FLORIDA
V. E. Bourland

Weather still hot and very little rainfall. Groves are showing the need of rain, some are being worked and some irrigated. Scale is still bad in some groves as it has been too dry to use oil most all of the summer. Cover crops in most groves are good. Fruit is looking very good considering everything, and sizing is very good.

Most young trees have made satisfactory growth so far. All ditches should be cleaned out, or made, as we can expect rain, and maybe heavy in September, as it is Equinoctial month.

Pasture grasses has been very good, some have been irrigated. Most cattle are in pink condition. Truck farmers are making up few seed beds for fall planting.

NEW U. S. STANDARDS ANNOUNCED FOR FLORIDA GRAPEFRUIT

The U. S. Department of Agriculture has announced new U. S. stndards for grade applicable to grapefruit produced in Florida. The new standards will become effective September 14, 1952.

Standards which are currently applicable to both Florida and Texas grapefruit will remain in effect for Texas grapefruit only, after the effective date for the new Florida standards.

Unanimously approved at a public hearing held by the Florida Citrus Commission at Lakeland, Fla., in May 1952, the new standards for Florida grapefruit differ from present standards principally as follows:

1. In the U. S. No. 1 grade, the new standards will reduce permitted discoloration from ½ to 1/3 of the surface; change the requirement for shape from "fairly well formed" to "well formed"; and change the requirement "free from damage by buckskin" to "free from buckskin."

2. Change the definition of damage by scale and damage by ammoniation, and reduce the amount of discoloration permitted in the U. S. No. 2 grade.

3. Add the U. S. No. 3 grade which was in effect in 1947, change the pack sizes to agree with the actual count, and define "diameter" and "mature" in the standards.

Other minor changes in the new standards include the rewording of a number of definitions for clarification.

USDA PURCHASES CONCENTRATED ORANGE JUICE

The U. S. Department of Agriculture has announced that offers have been accepted for 92,300 cases, 12 No. 3 cylinder cans per case, of concentrated orange juice at prices ranging from $9.30 to $9.45 per case.

This concentrate, which is the 3 plus 1 ratio, will be delivered to nonprofit school lunch programs during the period September 8 through October 15, 1952. The purchases were made with Section 32 funds.

Purchases were made from three processors in California under Announcement FV-194 dated August 4. These acceptances complete the purchases to be made under this announcement.

REFRIGERATION KEEPS PACKAGED FRUITS AND VEGETABLES FRESH

Improved methods for repackaging fresh fruits and vegetables are coming from extensive tests conducted under the Research and Marketing Act of 1946, say scientists of the U. S. Department of Agriculture. The tests emphasize the importance of refrigeration in keeping packaged commodities fresh.

Results are giving precise information on the type of films best suited for packaging different fruits and vegetables, on the need for ventilation in films used to package certain products, and on the temperatures required to maintain freshness. The work is an important phase of the Department's studies on the handling and transportation of fruits and vegetables.

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New Shipping Season Starts

The 1952-1953 shipping season for Florida grapefruit is now on the way. First reported picking of grapefruit was on September 15, and first shipments rolled northward on September 19. Neither shipping nor picking operations are as yet on an extensive plane, since only a small percentage of extremely early bloom fruit is sufficiently advanced to pass the maturity tests.

First shipments were made from the Winter Haven section and consisted of Pinks and Duncans, the former commanding a price of $6 FOB, and the latter running from $4 to $4.50 per box. At this writing, prices received on the Northern markets are unavailable.

While not too optimistic, growers generally are looking for a better financial return for their fruit than was experienced last year. With fruit of excellent quality and favorable appearance and with ready cash in the hands of buyers, growers believe that prices will be maintained at a higher level than last season.

Reports of field men indicate that both oranges and tangerines are sizing up well with indications that the quality of these crops will command consumer approval.

All told, growers are entering the new season with much brighter prospects, certainly with much brighter anticipations, than a year ago.

This Month

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